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The Munich hailstorm from 12 July 1984 - a spectacular convective event in Mid Europe

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In the evening of the 12 July 1984 southern Bavaria and especially Munich was struck by an exceptionally severe hailstorm. Hailstones with a diameter of up to 10 cm and stormy winds damaged 70000 houses, 200000 cars, and 150 aircrafts. More than 400 people were wounded. The total economic damage to be covered by insurances amounted to 1.5 billions DM.

Hail fell within a 250 km long and 5 - 15 km wide hail-swath beginning near Lake Constance and ending in eastern Bavaria near the Austrian border. It formed at the southern border of a zone with thunderstorms and propagated eastwards with a speed of 60 - 70 kmh^{-1}.

The hail-producing super-cell developed within a potentially unstable air mass with a moist layer in the lower troposphere. This layer was capped by an inversion at first, so that the stratification was stable against normal convective overturnings. However, a lifting of less than 100 hPa was enough to destroy the inversion and release the instability. The ascending motion necessary for that was caused by the approach of an upper level short wave trough travelling from southern France northeastwards. However, also orographic effects played an important role for the first release of the convection. As shown by the radar data from the Swiss network, the first convective cells developed in the mid tropospheric levels above the Swiss Alps producing some showers there. They formed the starting point for the release of deep convection northeast of the Alps and for the formation of the hail-producing super cell by embracing the moist and potentially unstable air lying over southern Bavaria.

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After passing Bavaria the hail-producing system was transformed into a typical meso-scale convective complex with a nearly circular upper cloud shield with a diameter of 600 km and cloud top temperatures below -60 °C. It moved further northeastwards and influenced strongly the upper air current.

In the paper a short description of the event is given followed by a discussion of the synoptic and meso-scale processes leading to the formation of the hail-producing system.